

Adaptor serving for both mobile phone unit and  
private IP phone unit

Background of the Invention

1. Field of the Invention

5       The present invention relates to an adaptor serving  
for both a mobile phone unit and a private IP (Internet  
protocol) telephone of which the mobile phone unit can be  
used as the private IP telephone unit.

2. Description of the Related Art

10       In recent years, a private IP telephone unit that uses  
a LAN (local area network) as a private telephone network  
circuit, which spreads over premises, is known.

A sales person who mainly works in a suburb area often  
uses a mobile phone unit. When he or she goes back to his  
15   or her office, he or she uses a private IP telephone unit.  
In this case, since the telephone number of the mobile  
phone unit is different from the telephone number of the  
private IP telephone unit, when someone wants to urgently  
contact the sales person, the calling party should call him  
20   or her with the suitable telephone number of the mobile  
phone unit or the private telephone unit.

In addition, a technology of which a mobile phone unit  
has a function for an IP telephone has been disclosed (for  
example, refer to Related Art Reference 1).

25       [Related Art Reference 1]

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Conventionally, such a sales person should have both a

mobile phone unit and a private IP telephone unit. In addition, when he or she uses a mobile phone unit, he or she cannot use functions of a multi-functional telephone of the office. Since the telephone number of the mobile phone unit is different from the telephone number of the private IP telephone, namely, there are a plurality of telephone numbers, when someone needs to contact him or her, unless the calling party memorizes both the telephone numbers, he or she cannot contact the called party at once. In addition, there is a telephone directory for mobile phone units independent of a telephone directory for private IP telephone units.

In addition, if a calling party goes out and a called party is in a hot spot of a wireless LAN, when the calling party calls the called party, the calling party should pay a connection fee of the mobile phone unit. Moreover, when the called party leaves from the hot spot, the calling party cannot make a call to the called party over the private IP telephone network.

Since charging cradles for both a mobile phone unit and a private IP telephone unit are necessary, the desk space of the user becomes narrow. In addition, although a wired LAN connection can be used, a mobile phone unit is wirelessly connected to a mobile phone network. Thus, the battery life shortens.

#### Summary of the Invention

Therefore, an object of the present invention is to

provide an adaptor serving for both a mobile phone unit and a private IP telephone unit, of which the mobile phone unit can be used also as the private IP telephone unit.

To solve the foregoing problem, the present invention  
5 is an adaptor serving for both a mobile phone unit and a private IP telephone unit, which is connectable to the mobile phone unit through a low power wireless system or a wired cable and connected to an IP-PBX through an IP network, the adaptor comprising: a telephone unit  
10 controller for managing resource data of the mobile phone unit; and a VoIP (Voice over IP) extension section for providing the mobile phone unit with a function of a private IP telephone unit in cooperation with the IP-PBX, wherein when a call is made with the mobile phone unit, a  
15 telephone number of the called mobile phone unit which is input from the calling mobile phone unit is converted into a telephone number of a called private IP telephone unit and the call is made to the telephone number of the called private IP telephone unit, and wherein when a call is  
20 received to a telephone number of the private IP telephone unit, it is determined whether or not the mobile phone unit is connected to the adaptor and when connected, a telephone call is performed with the mobile phone unit.

With the foregoing structure, since a mobile phone  
25 unit and a private IP telephone unit are mediated, an IP network can be switched from and to a mobile phone network without user's awareness thereabout.

These and other objects, features and advantages of the present invention will become more apparent in light of the following detailed description of a best mode embodiment thereof, as illustrated in the accompanying  
5 drawings.

#### Brief Description of Drawings

Fig. 1 is a schematic diagram showing a structure of a network using an adaptor serving for both a mobile phone unit and a private IP telephone unit according to the  
10 present invention;

Fig. 2 is a flow chart describing an operation in the case that a telephone call is made using the adaptor according to the present invention; and

Fig. 3 is a flow chart describing an operation in the case that a telephone call is received using the adaptor  
15 according to the present invention.

#### Description of Preferred Embodiments

Next, with reference to the accompanying drawings, an embodiment of the present invention will be described.

20 Fig. 1 shows a structure of a network using an adaptor serving for both a mobile phone unit and a private IP telephone unit according to the present invention. Adaptors 1 to N are connected to an IP-PBX through the Internet or an intranet. In other words, the adaptors 1 to  
25 N can be connected to the Internet or the intranet through a LAN (intranet) within a company, an access point of a provider, a hot spot of a wireless LAN, or the like. Thus,

the adaptors 1 to N can be used as private IP telephone unit terminals within the company.

A mobile phone unit is connected to an adaptor through a low power wireless system or a wired cable. Telephone units 1 to N connected to the IP-PBX (Internet Protocol - Private Branch eXchange) are conventional office telephone units used as extension telephone units (private IP telephone units) and public telephone units through the IP-PBX.

10       A logic circuit 11 of the adaptor comprises a telephone unit controller 12, a memory editor 13, and a VoIP (Voice over IP) extension line section 14. The telephone unit controller 12 manages resource data (data of telephone directory, telephone history, mail, and so  
15       forth). The memory editor 13 links a telephone directory of the mobile phone unit and a telephone directory of the IP-PBX in cooperation with a telephone directory controller 22 of the IP-PBX. The VoIP extension line section 14 provides the mobile phone unit with a function as an  
20       extension telephone unit in cooperation with the IP-PBX. A QoS (Quality of Service) controller 15 is a circuit that performs control for minimizing loss of audio data due to communication congestion of a communication path (intranet or Internet). A charging circuit 16 is a circuit that  
25       charges a battery of the mobile phone unit. The charging circuit 16 includes a protecting circuit that protects the battery from being overcharged.

A call controller 21 of the IP-PBX controls extension telephone units (private IP telephone units). A telephone directory controller 22 links the telephone directory of the IP-PBX and the telephone directory of the mobile phone unit in corporation with the memory editor 13 of the adaptor. A QoS controller 23 is a circuit that performs control for minimizing loss of audio data due to communication congestion of the communication path (intranet / Internet).

10       According to the present invention, an adaptor connected to a mobile phone unit can be used as a private IP telephone unit. Thus, the resources of the mobile phone unit used in a suburb area can be directly used for the private IP telephone unit. In this case, the resources  
15       include hardware resources such as a microphone and software resources such as a telephone directory. The software resources are linked with information of the private IP telephones by the memory editor of the adaptor.

      Since the adaptor has a function for detecting  
20       characteristics of a network and automatically switching settings thereof, the adaptor can be placed anywhere as long as there is a network environment. In addition, the adaptor has a function for confirming that it is not connected to the mobile phone unit and forwarding a call  
25       addressed to the private IP telephone unit to the mobile phone unit.

      When a sales person places the adaptor in his or her

house, office, or hot spot, as long as he or she has a mobile phone unit, he or she can use it as a private IP telephone unit in a network environment or a normal mobile phone unit in non-network environment without his or her awareness thereabout. In this case, each member of the office can summarize all telephone numbers of other members of the office in extension numbers of the private IP telephone units assigned.

Next, with reference to flow charts of Fig. 2 and Fig. 3, operations of the adaptor according to the present invention in the case that a telephone call is made and a telephone call is received will be described.

Operation of the adaptor in the case that a telephone call is made:

The telephone unit controller 12 sends a telephone number of a mobile phone unit that is input therefrom (at step 1) to the VoIP extension line section 14. The VoIP extension line section 14 converts the telephone number of the mobile phone unit into a telephone number of a corresponding private IP telephone (at step 2). The private IP telephone unit originates a call to the converted telephone number (at step 3).

Operation of the adaptor in the case that a telephone call is received:

The VoIP extension line section 14 receives a call with a private IP telephone unit (at step 11). The telephone unit controller 12 determines whether or not a

mobile phone unit is connected to the adapter (at step 12).

When a mobile phone unit is connected to the adapter, with a microphone and a speaker of the mobile phone unit, a telephone call is performed as the private IP telephone unit (at step 13).

When a mobile phone unit is not connected to the adaptor, the VoIP extension line section 14 determines whether or not a telephone number to be forwarded has been designated (at step 14). When a telephone number to be forwarded has been designated, the VoIP extension line section 14 forwards the call to the telephone number to be forwarded (at step 15). A telephone call is performed with the forwarded telephone unit (at step 16). When a mobile phone unit is not connected to the adaptor and a telephone number to be forwarded has not been designated, the VoIP extension line section 14 forwards the call to a telephone number of a mobile phone unit (at step 17). A telephone call is performed with the mobile phone unit (at step 18).

As was described above, when the adaptor that is connected to a mobile phone unit and used as a private IP telephone unit is prepared, the following advantages will be obtained.

When an Internet environment (an LAN system within a company, an access point of a provider, or a hot spot service of a wireless LAN) and the adaptor are used, a mobile phone unit can be used as a private IP telephone unit.



In this case, the user can inexpensively use a private IP telephone unit at a hot spot in a suburb area without need to pay an expensive mobile phone connection charge.

Since the adaptor has a function for converting a  
5 telephone number of a private IP telephone unit into a  
telephone number of a mobile phone unit or vice versa, when  
the user memorizes only a telephone number of a private IP  
telephone unit of a called party, the user can call both  
telephone numbers of a private IP telephone unit and a  
10 mobile phone unit of the called party.

Since the adaptor has a function for linking the  
content of a memory of a private IP telephone unit and the  
content of a memory of a mobile phone unit, the user can  
use the telephone directory of the private IP telephone  
15 unit as the telephone directory of the mobile phone unit  
when he or she is out.

Since the adaptor has functions of a multi-functional  
telephone unit as a private IP telephone unit, the user can  
use the functions such as a forwarding function and a  
20 conference function of the multi-functional telephone unit  
with a mobile phone unit.

Since the adaptor has a call forwarding function, if a  
mobile phone unit is disconnected from the adaptor, an  
incoming call can be forwarded to a telephone number of a  
25 mobile phone unit or a registered telephone number.

Since the adaptor has a network characteristic  
detecting function, even if the adaptor is used in another

network environment, the adaptor can be automatically connected to the network.

Since the adaptor can be connected through a low power wireless system or a wired cable, the user can use the  
5 adaptor in his or her desired scene.

As was described above, since the adaptor according to the present invention mediates a mobile phone unit and a private IP telephone unit, a connection can be switched between an IP network and a mobile phone network without  
10 user's awareness thereabout.

Since a telephone number of a mobile phone unit is automatically converted into a telephone number of a private IP telephone unit or vice versa, the user does not need to have both a mobile phone unit and a private IP  
15 telephone unit.

With a mobile phone unit, the user can use functions of a multi-functional telephone as a private IP telephone unit (call forwarding function, a telephone conference, and so forth).

20 When the user is absent in the office, since an incoming call addressed to his or her private IP telephone is automatically forwarded to him or her, all telephone numbers can be summarized in telephone numbers of private IP telephone units.

25 Since the content of a telephone directory of a mobile phone unit and the content of a telephone directory of a private IP telephone unit are linked, the two telephone

directories of the mobile phone unit and the private IP telephone unit can be unified to one telephone directory.

Since the charging circuit controls charging of a battery of a mobile phone unit, a charging cradle dedicated therefor can be omitted. Thus, the desk space of the user can be effectively used.

Since a wired LAN connection can be used with the adaptor, it is not necessary to wirelessly connect a mobile phone unit to a mobile phone network. Thus, the battery life of the mobile phone unit becomes long.

Although the present invention has been shown and described with respect to a best mode embodiment thereof, it should be understood by those skilled in the art that the foregoing and various other changes, omissions, and additions in the form and detail thereof may be made therein without departing from the spirit and scope of the present invention.